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ف ٢ (أ) E٣٣٠٦

Arab Republic of Egypt
Ministry of Education
The completion of the basic education certificate
Examination 2015 for our sons abroad

Algebra & Statistics | Second Term | Time : 2 hours

الجبر والإحصاء بالإنجليزية للصف الثالث الاعدادى (الفصل الدراسى الثانى ٢٠١٥) (الأسئلة في صفحتين)

تنبيه هام : (يسلم الطالب ورقة امتحانية باللغة العربية مع الورقة المترجمة) (يسمح باستخدام الآلة الحاسبة)

Answer the following questions

First question:

choose the correct answer from the given answers:

(1) The solution set of the equation $x^2 + 9 = 0$ is .....

a) $\{3, -3\}$. b) $\{-9\}$. c) ϕ. d) $\{(3, -3)\}$

(2) If $P(A) = 0.75$ then $P(A') =$.....

a) 1 b) 0.75 c) 0.5 d) 0.25

(3) If $n(x) = \frac{1}{x} - \frac{3}{x}$ where $x \neq 0$ then $n^{-1}(x)$ is .....

a) $\frac{-2}{x}$ b) $\frac{x}{2}$ c) $\frac{2}{x}$ d) $\frac{-x}{2}$

(4) If A and B are two mutually exclusive events. Then $P(A \cap B) =$.....

a) 1 b) *zero* c) $P(A)$ d) $P(B)$

(5) If $x = 1, y^2 = x + 3$ then $y =$.....

a) 4 b) 2 c) -2 d) ± 2

(6) The set of zeroes of the function $f(x) = x(x^2 - 1)$ is

a) $\{0\}$ b) $\{0, -1, 1\}$ c) $\{-1, 1\}$ d) R

Second question:

(a) By using the formula find the solution set of the equation

$x^2 - 2x - 2 = 0$ (where $\sqrt{3} \simeq 1.73$)

(b) Find $n(x)$ in the simplest form and showing the domain of n where

$$n(x) = \frac{x^2 + 3x}{x^2 - 4} \times \frac{x - 2}{2x + 6}$$

(بقية الأسئلة فى الصفحة الثانية)

Third question:

(a) Find the solution set for the two equations together

$$x - y = 0 \quad , \quad x^2 + y^2 = 18$$

(b) If A and B are two events of the sample space of a random experiment and

$P(A) = 0.3 \quad P(B) = 0.6 \quad P(A \cap B) = 0.2$

Find : (1) $P(A')$ (2) $P(A \cup B)$

Fourth question:

(a) Find $n(x)$ in the simplest form showing the domain of n where

$$n(x) = \frac{5x - 25}{x^2 - 25} + \frac{x^2 + 5x}{(x+5)^2}$$

(b) Find the solution set for the two simultaneous equations together

$$2x - y = 3 \quad , \quad 3x - y = 4$$

Fifth question:

(a) Prove that $n_1 = n_2$ where

$$n_1(x) = \frac{x^2+4}{x^2+4x} \quad , n_2(x) = \frac{3x^2+4}{3x^2+4x}$$

(b) Graph of the function $f : f(x) = x^2 - 1$ take $x \in [-3,3]$ and from the graph find the solution set of the equation: $x^2 - 1 = 0$

minimum = -1

equation = 0

(انتهت الأسئلة)

Algebra 2015
- 2nd term -

Q.1 Choose

1. (c) ϕ
2. (d) 0.25
3. (d) $\frac{-x}{2}$
4. (b) Zero
5. (d) ± 2
6. (b) $\{0, -1, 1\}$

Q.2 (a) $x^2 - 2x - 2 = 0$, $\sqrt{3} \simeq 1.73$

$a = 1$, $b = -2$, $c = -2$

$$\therefore x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{2 \pm \sqrt{4 + 4 \times 1 \times 2}}{2 \times 1} = \frac{2 \pm \sqrt{12}}{2}$$

$$x = \frac{2 \pm 2\sqrt{3}}{2} \quad \begin{cases} \frac{2 + 2\sqrt{3}}{2} = 2.73 \\ \frac{2 - 2\sqrt{3}}{2} = -0.73 \end{cases}$$

$\therefore$ S.S $= \{2.73, -0.73\}$

(b)

$$n(x) = \frac{x^2 + 3x}{x^2 - 4} \times \frac{x - 2}{2x + 6}$$

$$= \frac{x\cancel{(x+3)}}{\cancel{(x-2)}(x+2)} \times \frac{\cancel{(x-2)}}{2\cancel{(x+3)}}$$

domain $= R - \{2, -2, -3\}$, after reduction

$$\therefore n(x) = \frac{x}{x+2} \times \frac{1}{2}$$

$$\therefore \boxed{n(x) = \frac{x}{2(x+2}}$$

$\boxed{Q.3}$ (a) $x - y = 0$ (1)

$x^2 + y^2 = 18$ (2)

From (1) $\boxed{x = y}$, substitute in (2)

$\therefore y^2 + y^2 = 18$ $\therefore 2y^2 = 18$ $(\div 2)$

$\therefore y^2 = 9$ $\therefore y = 3$, $y = -3$

$\therefore x = y$ $\quad \{ x = y$

$\therefore x = 3$ $\quad \therefore x = -3$

$\therefore S.S = \{(3,3), (-3,-3)\}$

(b) $P(A) = 0.3$, $P(B) = 0.6$

$P(A \cap B) = 0.2$

(c) $P(A') = 1 - P(A)$

$= 1 - 0.3$

$= 0.7$

(d) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.3 + 0.6 - 0.2$

$= 0.7$

$\boxed{Q.4}$ (a) $n(x) = \dfrac{5x-25}{x^2-25} + \dfrac{x^2+5x}{(x+5)^2}$

$\therefore n(x) = \dfrac{5\cancel{(x-5)}}{\cancel{(x-5)}(x+5)} + \dfrac{x\cancel{(x+5)}}{(x+5)^{\cancel{2}}}$

$\therefore$ domain $= R - \{5, -5\}$

$\therefore n(x) = \dfrac{5}{x+5} + \dfrac{x}{x+5} = \dfrac{x+5}{x+5}$

$\therefore \boxed{n(x) = 1}$

(b) $2x - y = 3$ (1)

$3x - y = 4$ (2)

by subtracting (1) from (2)

$\therefore 3x - \cancel{y} = 4$

$\ominus \quad \oplus \quad \ominus$

$2x - \cancel{y} = 3$

$\therefore x = 1$ $\boxed{x = 1}$

by substituting in (1)

$\therefore 2(1) - y = 3$

$2 - y = 3$

$2 - 3 = y$ $\therefore \boxed{y = -1}$

$\therefore S.S = \{(1, -1)\}$

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Q.5 (a)

$$n_1(x) = \frac{x^2+4}{x^3+4x}$$

$$n_1(x) = \frac{\cancel{x^2+4}}{x\cancel{(x^2+4)}}$$

domain $= R - \{0\}$

$$n_1(x) = \frac{1}{x}$$

$$n_2(x) = \frac{3x^2+4}{3x^3+4x}$$

$$n_2(x) = \frac{\cancel{3x^2+4}}{x\cancel{(3x^2+4)}}$$

domain $= R - \{0\}$

$$n_2(x) = \frac{1}{x}$$

$\because$ domain of n_1 = domain of n_2

$n_1(x) = n_2(x)$

$\therefore n_1 = n_2$

(b) $f(x) = x^2 - 1$, $x \in [-3, 3]$

x	-3	-2	-1	0	1	2	3
F(x)	8	3	0	-1	0	3	8

vertex point $(0, -1)$

Min value $= -1$

eqn. of axis of symmetry is : $x = 0$

From the graph

the S.S $= \{1, -1\}$